Acral rash in a child with COVID-19.

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Summary

A 9-year-old boy suffering from COVID-19 presented after an acute conjunctivitis, symptomatic glossitis, cheilitis, then reticular livedo, urticaria angioedema and finally a palmar-plantar scarlet fever-like rash. These COVID-19 symptoms observed consecutively in the same child have been described in isolation among the cutaneous manifestations of COVID-19. The authors discuss the pathogenesis of these late symptoms of SARS-CoV-2 infection.

Keywords

COVID-19, child, skin, scarlet fever, Kawasaki disease.

Like other viral infections, COVID-19 often occurs on the skin with signs whose multiplicity is linked not only to factors dependent on the causal virus but also on the reactivity of the affected subject. These signs, which present separately in the different subjects, sometimes can appear in sequence in the same subject, as in the case described in the current report.

Case report

A 9-year-old boy with Down syndrome and alopecia areata universalis presented high fever for 5 days and cough at the end of January 2020; he also had diarrhea that lasted for 3 weeks. During the same period, some family members had flu symptoms.

Three weeks after the onset of acute symptoms, the child had conjunctivitis, symptomatic glossitis and mild scaling cheilitis. After 1 month from the beginning, new findings appeared, particularly livedo reticularis of the lower limbs and acute urticaria with intensely itchy eyelid angioedema. The latter was treated with oral corticosteroids.

After 2 months from the beginning, behavioral disorders appeared that were interpreted as a recurrence of PANDAS syndrome; the latter was present in his past history. Erythema and massive, hard palmar and plantar edema also occurred (Fig. 1, 2) for which the dermatologist’s advice was required. The latter, having ascertained that the first family member suffering from febrile respiratory symptoms was an aunt who had stayed in an area at high risk for COVID-19, recommended hospitalization of the child in a pediatric infectious disease department. The swab for SARS-CoV-2 was negative but the immunochromatographic serological test for IgG-IgM anti-SARS-CoV-2 (VivaDiag COVID-19 rapid test, VivaChek Laboratories, INC, USA) showed the presence of specific IgG for SARS-CoV-2 in the absence of specific IgM. Blood chemistry tests, inflammation indexes, coagulation tests were within the normal limits; cardiological investigations did not reveal any abnormalities. After 7 days from hospitalization, the child presented large flaps scaling on the feet (Fig. 4) and with
glove finger-like aspect on the hands (Fig. 3). The final diagnosis was acral rash in a child with COVID-19.

**Discussion**

The history of this child and the presence of IgG antibodies specific for SARS-CoV-2 make us believe that the general, respiratory and gastrointestinal manifestations of the first 3 weeks are very likely to be attributed to COVID-19. Probably, also the cutaneous and mucous membrane manifestations experienced by the child from the fourth to the twelfth week since the onset of the fever are also to be charged to COVID-19. We believe it because all these clinical signs, which had never occurred before, occurred immediately after the classic general, respiratory and gastroenteric manifestations. Moreover, the acute-onset, self-healing in a few weeks livedo reticularis and the acute parainfectious urticaria together with other clinical features are those described in the course of COVID-19 (7, 8); mucositis and acral rash have been also described both in isolation during COVID-19 and in the context of COVID-19 related Kawasaki disease (6, 9).

As with other viruses, the cutaneous and mucosal manifestations of COVID-19 are multiple and similar to those of other virus diseases (1, 3, 8): each virus can give different clinical manifestations and more viruses can give the same clinical manifestation, such as erythema multiforme and parainfectious urticaria widely demonstrate. The multiplicity of clinical manifestations and their similarity in different viral infections depend in part on factors inherent to the virus such as viral load, organotropism, variants with different aggressiveness, in part on the host’s reaction based on innate and adaptive immunity which in turn
are influenced by numerous factors, including the age of the patient. In children, COVID-19 is more often paucisymptomatic or asymptomatic (2, 5), probably because of a lot of reasons as follows: their innate and adaptive immunity is much more trained by frequent, both spontaneous and vaccine infectious stimulations; moreover, in children there are less comorbidities and a lower amount of ACE-2 receptors compared to adults; finally, in children the atopic diseases are more frequent than in adults (5). Indeed, it has been shown that subjects with asthma, contrary to expectations, do not develop a more severe COVID-19, perhaps thanks to the protective role of eosinophils, which are strongly reduced in subjects with COVID-19 (4, 10), and the fewer ACE-2 receptors (4).

Also interesting is the timing of the clinical manifestations of our patient. The average duration of persistence in the body of SARS-CoV-2 is 20 days (12). After the disappearance of diarrhea, our patient had cutaneous and mucous clinical manifestations for another two months and these manifestations appeared about 1 month after the onset of the classic symptoms. This data coincides with another: in Italy the first autochthonous case of COVID-19 was diagnosed on February 20, 2020 and we began to see and recognize the first cases of vasculitic, chilblain-like lesions of the feet (7) as COVID-19 related on March 29, 2020. In almost all cases the PCR on the swab was negative. If the virus is no longer present in the body, these tail vasculitic manifestations of COVID-19 are probably due to the body’s immunological reaction. This hypothesis is favored by the observation that similar but more severe manifestations up to thrombotic occlusion and gangrene are observed even in severe, fatal cases of late-stage COVID-19.

Also the cutaneous and mucous manifestations with involvement of the oral cavity and conjunctiva have been observed both as isolated and late manifestations (6) or in the context of atypical and severe Kawasaki disease (9). Also in this case, as for the vasculitis of the feet, it was the peak of incidence 30 times higher than expected and its coincidence with the advent of COVID-19 to establish a relationship between the two diseases, also shedding new light on the pathogenesis of Kawasaki disease.

Both severe acroschismic lesions and Kawasaki-like manifestations have been attributed to the cytokine storm; it has been hypothesized that when innate and adaptive immunity fails to get rid of the virus, excessive and persistent inflammation occurs as compensatory mechanism and is expressed in the form of interstitial pneumonia with acute respiratory failure, hemophagocytic lymphohistiocytosis with multiorgan failure or disseminated intravascular coagulation (5).

However, this hypothesis is contradicted by the observation that similar but milder skin-mucous lesions such as those described by the dermatologists occur belatedly in paucisymptomatic or asymptomatic cases in which there has been an effective immune response.

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References


